



Dear readers!

The challenges of engineering education currently become more and more acute. The delayed responses to these challenges are blamed on intensive global changes in science and technology. Another reason of the tardy responses to the challenges of the external and internal environment is the rigidity of the education system in general, and engineering training, in particular. It has a negative impact not only on the system of engineering education, but also on national society and economy, engineering capability and homeland security of the country.

The scientific, engineering and educational community is hardly indifferent to these problems. Hundreds of national and international scientific workshops, methodical seminars, and conferences are annually held in Russia. These issues are also discussed in public consultations and parliamentary hearings. The discussions result in numerous recommendations, some of which, if being timely implemented, would contribute to positive changes in the system of engineering training. However, as a rule, the recommendations approved by the professional community are not implemented or implemented far too late.

The AEER experts have analyzed the implementation rate of the recommendations approved at the conferences and hearings. Thus, during the studied period (three years) there were 52 events, including 7 federal scale arrangements, and 45 regional events held in different regions of the RF. They approved a number of recommendations aimed at improving the Russian system of engineering training and creating conditions for successful engineering development. The total number of recommendations was 141, including those that were repeated, and 98 without regard to the repeated ones. Among the latter 5 recommendations were implemented, 40 were being implemented, there was no information about 6 recommendations, and 47 are not implemented, which makes up more than a half of the total number. It should be noted that 30% of the whole number of recommendations related to the strategy

of engineering education development and improvement of legal framework for engineering training. More than 70 % of the recommendations concerned internal university issues, for example, engineering training content and techniques, education quality, monitoring, management system, etc.

The latter circumstance proves the fact that a great number of issues related to the engineering education system that meet the global and national challenges depend on university's staff – managerial, scientific and teaching ones. The success or failure of university mission strongly depends on skill level of the university staff involved in scientific, educational and managerial activities. The staff's skill level, as well as their public stance, influences not only the content (core) of engineering training, but also the degree of the process bureaucratization, goal-setting, and choice of means for goal achievement. One of the tasks to be performed by the engineering educational and scientific community is to change a focus from the indicators that have no direct relation to the quality of engineering training on those ones that reflect its real development. In this regard, closer attention should be paid to the system of further professional development for university staff, since their skill level ensures university efficiency in meeting challenges and rapidly changing requirements. Formally, the system performance is stable and efficient. As a rule, a career promotion of any university staff requires a certificate in further training dated no later than 5 years. It should be noted that some of the events mentioned above provided such certificates for the participants. However, these certificates can only confirm that a person has been provided with new and perhaps useful information, but they cannot ensure efficient application of the information for the university's needs. A great rate of non-implemented recommendations may indirectly prove this fact.

Within this context, the system of further training for faculty, scientific and managerial

staff of engineering universities may serve as one of the most prospective area for the development of Russian engineering education. Federal and regional education managers should also be involved in the further training programmes. We should also note that the faculty implementing engineering programmes, especially those who deliver design and technological courses, should have specific industrial further training. There is no stimulation in universities for such form of faculty's industrial training as training at leading plants to develop brand new skills required in modern engineering activities. This fact hinders the improvement of engineering training, since the famous rule "You cannot teach what you cannot do" still works.

We consider that there are three basic principles to be followed while developing further professional training for university staff: **focus on innovation, practice and efficiency**.

Each of the principles is implemented via definite actions and ways.

Focus on innovation achieved via understanding and implementation of unique and effective university management methods and educational techniques that ensure internationally recognized standards (in terms of graduates, research insights and engineering).

Practice-oriented focus is implemented via changes in content and implementation of education programmes, and further training programmes with taking into account acute problems of engineering training.

Focus on efficiency implies higher requirements for implementing learning outcomes obtained by graduates during training programmes.

In fact, within specified time, a trainee should demonstrate improved professional activities as a positive result of further training course, which is assisted by an organization that provides the course. The certificate in further training should contain the data about the efficient implementation of learning outcomes. It is also necessary to develop an efficient recording system to register learning outcomes related to specific problem solving and responses to particular challenges. If these three principles and the recording system are implemented, we will succeed in improving Russian engineering education and making it more attractive for both national and international applicants for engineering programmes.

Sincerely,
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